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Case Report

Portal pyaemia and portal vein gas - an unusual case of perforated diverticulitis

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ABSTRACT

Complicated diverticulitis is classified as having complications such as phlegmon, abscess, fistula or obstruction. A rare but life-threatening complication of diverticulitis is pylephlebitis or portal pyaemia, defined as septic thrombosis of the portal vein secondary to intra-abdominal infection. The diagnosis is often delayed due to its nonspecific clinical presentation. The study was reported the case of a 57-year-old male patient who presented with abdominal pain, and initial radiological evaluation suggestive of acute uncomplicated sigmoid diverticulitis. Despite appropriate antimicrobial therapy, the patient developed persistent bacteraemia, worsening abdominal symptoms, and features of cholestasis. Contrast-enhanced computed tomography (CT) demonstrated septic thrombophlebitis originating from a branch of the inferior mesenteric vein thought to have originated from perforated sigmoid diverticulum. Broad-spectrum intravenous antibiotics were escalated; the patient underwent a minimally invasive proctosigmoidectomy and made a good recovery. This case highlights the importance of maintaining a high index of suspicion for portal pyaemia in patients with diverticulitis who fail to improve with standard therapy. Timely diagnosis and aggressive management are critical to reducing morbidity and mortality.

Keywords: Portal pyaemia, Pylephlebitis, Diverticulitis, Proctosigmoidectomy

INTRODUCTION

Complicated diverticulitis is classified as having complications such as a phlegmon, abscess, peritonitis, fistula or obstruction. However, an uncommon complication of diverticulitis is portal pyaemia or pylephlebitis. Portal pyaemia is defined as septic thrombosis of the portal vein secondary to intra-abdominal infection.[1,2] It is a rare condition with an incidence approximately 0.4-2.7 in 100,000 and has a mortality rate ranging from 14% to >30%.[1-6]

Patients most often present with fever (75%) and abdominal pain (66%).[1] Diverticulitis is the leading identified source (26.5%), followed by appendicitis, cholangitis, pancreatitis and other intra-abdominal abscesses.[1] Contributing risk factors include underlying hypercoagulable states, malignancy, immunosuppression and cirrhosis, although some patients have no predisposing disorder.[7]

The study was presented a case of a rare complication of diverticulitis, portal pyaemia; highlighting the atypical presentation, the finding of portal pyaemia and the

diagnostic dilemmas associated with this complex problem.

CASE REPORT

A 57-year-old man presented to the emergency department with a three-day history of left sided lower abdominal pain. He reported loose stools, night sweats and a 12-month history of unintentional 10 kg weight loss. His relevant medical and surgical history includes; smoking, social alcohol misuse and a previous laparoscopic bilateral inguinal hernia repair.

On initial examination the patient was haemodynamically stable, afebrile with general lower abdominal tenderness, worse at the left iliac fossa. No peritonism was noted.

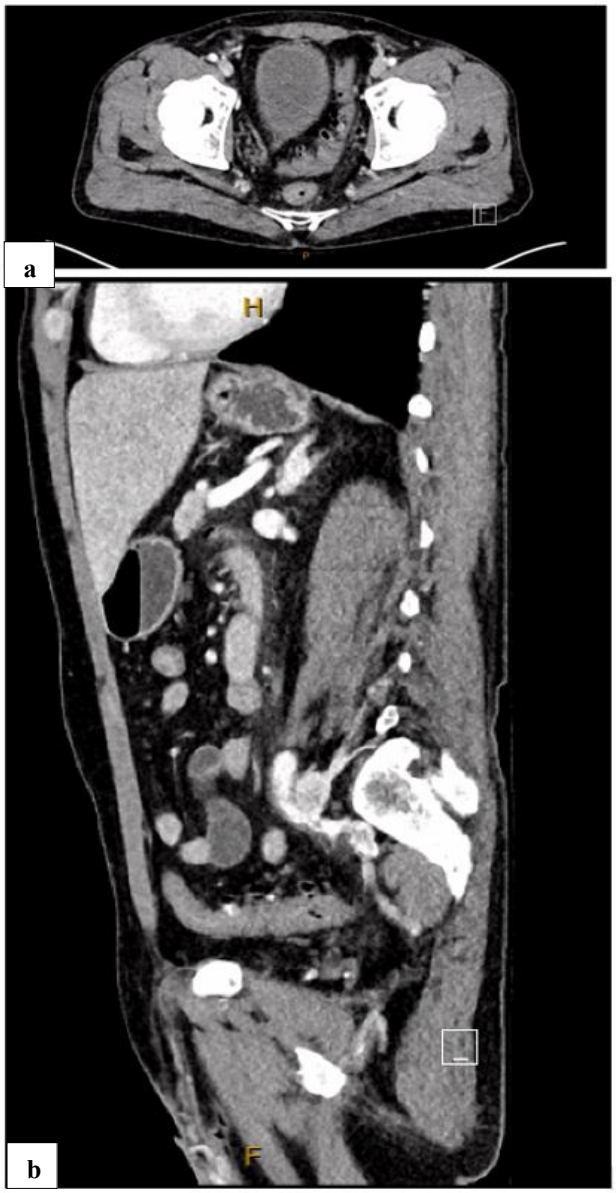

Figure 1: Low grade colitis and uncomplicated sigmoid diverticular disease (a) CT axial view, and (b) CT sagittal view.

Initial laboratory findings on admission demonstrated raised inflammatory markers: white blood cell count 13×10^9/l, neutrophil count 12.2×10^9/l, and C-reactive peptide level of 341 mg/l. Of note, he was thrombocytopenic with platelets of 96×10^9/l and an isolated bilirubin rise of 62 µmol/l. Computed tomography (CT) of the abdomen and pelvis reported left sided low-grade colitis, with uncomplicated diverticular disease at the sigmoid colon with no acute diverticulitis (Figures 1a and b).

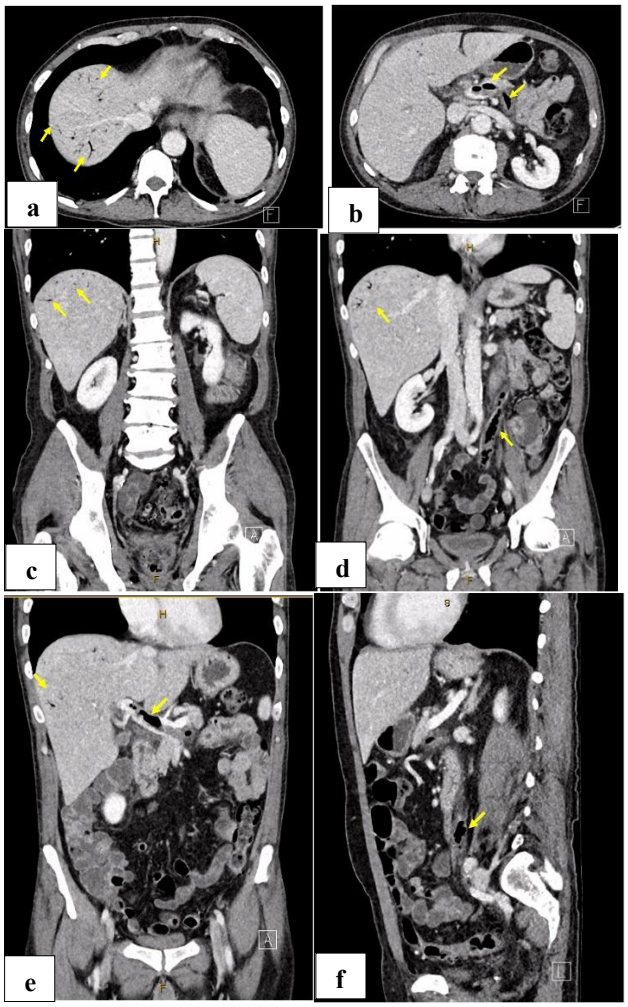

Figure 2: (a) CT axial, peripheral branching lucencies consistent with portal gas; (b) CT axial, gas tracking to portal vein; (c) CT coronal, peripheral branching lucencies consistent with portal gas; (d) CT coronal, peripheral branching lucencies consistent with portal gas, and tracking to IMV; (e) CT coronal, peripheral branching lucencies consistent with portal gas, and tracking to portal vein; and (f) CT sagittal, gas tracking to portal vein.

Blood cultures isolated *Clostridium innocuum* and *Parabeteriodes distasonis*. In conjunction with Infectious Diseases team, the patient was managed with intravenous (IV) ceftriaxone and metronidazole. Initially, the patient's clinical picture improved with down-trending inflammatory markers. However, on day four of admission

the patient's abdominal pain worsened, along with further LFT derangement and up-trending inflammatory markers. Concerningly, his platelet levels dropped to 22×10^9/l.

An abdominal ultrasound demonstrated features concerning for portal venous air, prompting a repeat CT. The CT demonstrated septic thrombophlebitis originating from a branch of the inferior mesenteric vein (IMV) extending to the main portal vein and liver (Figures 2a-f). This was thought to be secondary to a focal perforation of a sigmoid diverticulum. There was no free fluid or free gas evident radiologically.

On review, the patient remained haemodynamically stable however had evidence of new jaundice, persistent generalised abdominal pain and distension. Based on the patient's clinical, biochemical, and radiological deterioration, the decision was made to upgrade his antibiotics to piperacillin-tazobactam and perform a laparoscopic proctosigmoidectomy (Hartmann's) procedure. Intraoperatively, a clear perforation in the rectosigmoid mesentery was evident (Figure 3). This was contained and had no evidence of free perforation, attributing to the patients haemodynamic stability. The liver and gallbladder had a normal appearance.

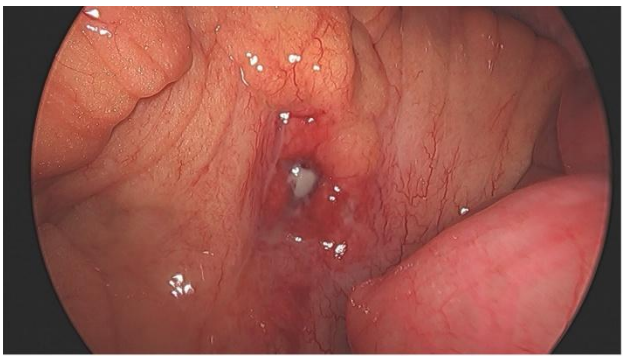

Figure 3: Intraoperative image of perforation of rectosigmoid mesentery.

Outcomes

On post-operative day four the patient had persisting abdominal distension and minimal stomal output. A repeat CT demonstrated mild reactive small bowel ileus, with progression of the occlusive thrombus. It had extended throughout the entire course of the inferior mesenteric vein with associated gas locules. There was also gas to the proximal superior mesenteric vein and main portal vein. Given these findings, the haematology team advised three months of therapeutic anticoagulation.

On day-10 of admission the patient was discharged with normal biochemical markers and followed up four weeks later in outpatient colorectal clinic. His post-discharge recovery was uncomplicated, and he was booked for a completion colonoscopy with consideration for a future Hartmann's reversal. Histopathology of the operative specimen demonstrated acute diverticulitis, focal diverticular perforation and acute suppurative serositis with no evidence of malignancy.

DISCUSSION

Portal pyaemia is an uncommon complication of intra-abdominal infections, most frequently diverticulitis, with potentially life-threatening consequences if not promptly recognised.[1,5,6] The present case was notable for its atypical presentation, occurring in a patient without classic risk factors, which illustrates the diagnostic challenges this syndrome can pose.

The likely mechanism in this case is septic thrombophlebitis extending from the perforated sigmoid colon through its venous drainage, the inferior mesenteric vein, into the portal system. In infections like diverticulitis, bacteria and gas can enter the small mesenteric veins, causing local thrombophlebitis that propagates proximally.[2,8] Imaging often shows portal/mesenteric vein gas or thrombus in such patients, as observed. Once the portal vein is seeded, further thrombosis ensues, explaining the patient's extensive portal thrombus. Pylephlebitis encompasses this cascade of events, leading with a contiguous septic focus which incites venous thrombosis and can ultimately lead to liver abscesses and portal hypertension if left untreated.[9]

The diagnosis of pylephlebitis is often delayed given its low rate of incidence and non-specific presentation. The clinical features (fever, mild abdominal discomfort and abnormal LFTs) are nonspecific and can mimic other illnesses.[1] Portal venous gas on CT is an ominous sign frequently linked to mesenteric ischaemia, but other differentials need to be considered such as infection tracking via the mesenteric-portal venous system or pylephlebitis.[8] The case also emphases that unexplained cholestasis in sepsis should prompt evaluation of the portal circulation system with doppler ultrasound or contrast CT.

Management of this case included IV antibiotics, source control through a Hartmann's procedure and therapeutic anticoagulation as per the haematology unit. One controversy in the literature is the role of anticoagulation in such cases. Current evidence supports antibiotics and source control as the mainstay management for most patients.[1] However, the current literature pool is heterogenous, with approximately 76.7-82% of patients receiving anticoagulation in recent years.[1] Other literature has demonstrated that anticoagulation can improve portal vein recanalisation and reduce chronic portal hypertension associated complications.[4,10] Others suggest that only specific subsets of patients should be anticoagulated, mainly those with a hypercoagulable state (malignancy or clotting factor deficiencies).[11] Further, there is significant debate about the length of treatment, with some recommending 3 to 6 months and others recommending lifelong anticoagulation.[4,7,12,13] Ultimately, there are no clear-cut guidelines on whether a patient with portal

pyaemia or pylephlebitis should be anticoagulated, and the clinical decision should be a multidisciplinary discussion with the clinician, haematology unit and patient.

CONCLUSION

Portal pyaemia from sigmoid diverticulitis is a rare but life-threatening condition. This case highlights an unusual presentation as obstructive jaundice in a young patient, the diagnostic pitfalls of non-specific symptoms, and the need for timely imaging. Management principles include aggressive antibiotic therapy, supportive care, and source control. The decision to anticoagulate must be individualised, balancing the theoretical benefits in thrombus resolution against bleeding risks. Clinicians should maintain a high index of suspicion for pylephlebitis in any patient with intra-abdominal sepsis and unexplained liver dysfunction.

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